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 S22X  
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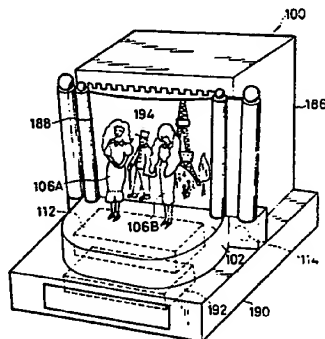
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## (54) **Animated display apparatus**

(57) The apparatus includes at least one article (e.g. figure 106A) having movable parts (e.g. eyes, mouth, limbs), a recording medium bearing at least sound information relating to the article, and means for playing back the medium and, as a result, causing movement of the parts and reproduction of the sound information. The medium may be a video tape 192, having two audio tracks associated with respective figures 106A, 106B, and having video information reproduced on screen 188 and including a figure 194. The respective figures may appear to communicate with each other. Part of the screen may display information which is detected by a sensor and used to control the programme of movement and sound.

FIG. 19



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1982.

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FIG. 1

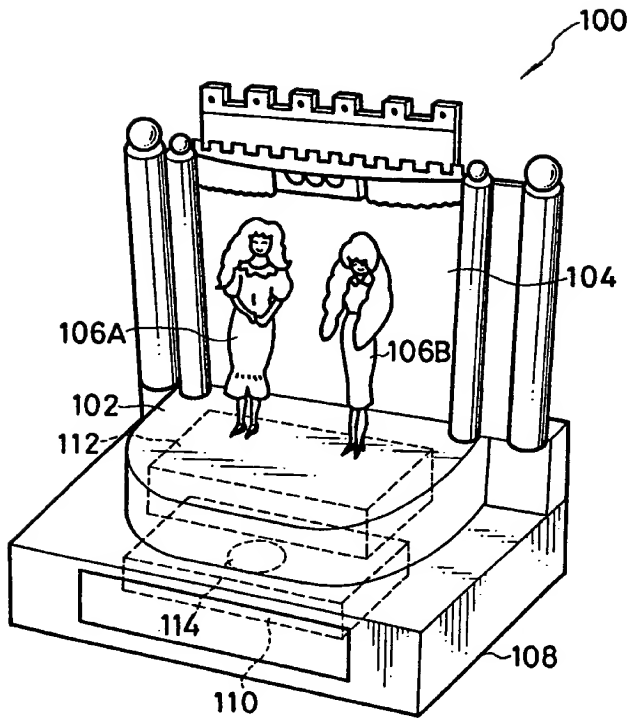


FIG. 2

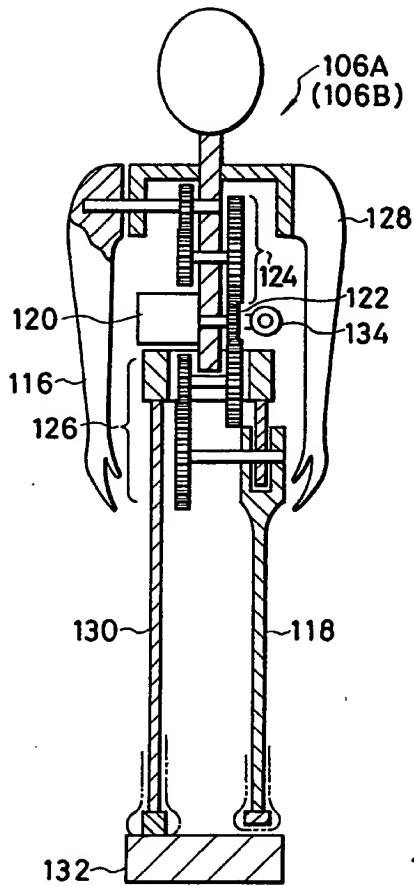


FIG. 3

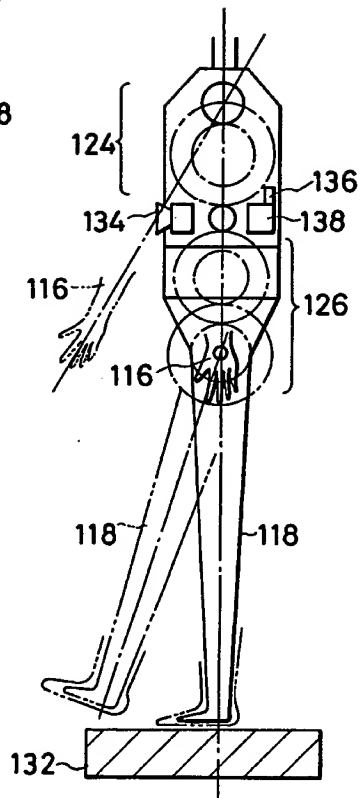


FIG. 4

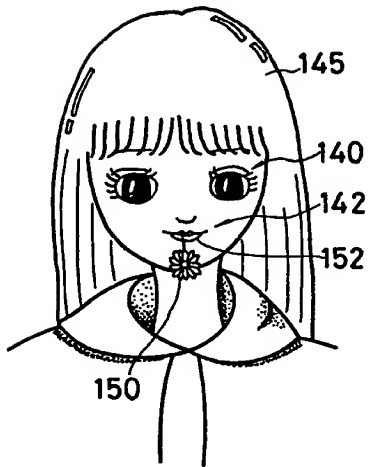


FIG. 5

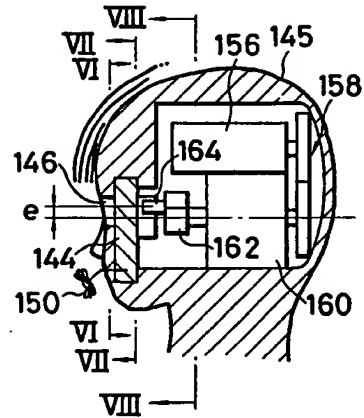


FIG. 6

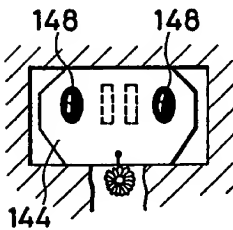


FIG. 7

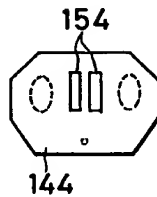


FIG. 8

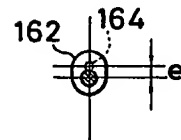


FIG. 9

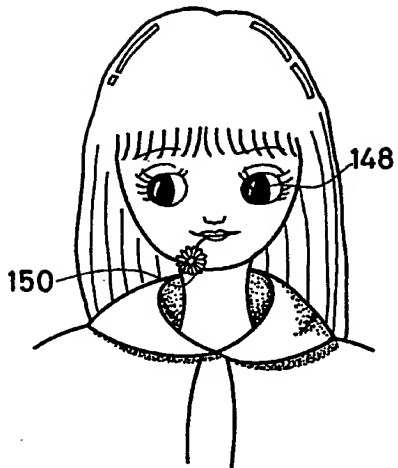


FIG. 10

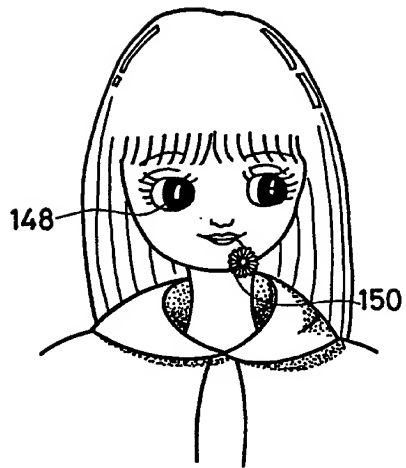


FIG. 11

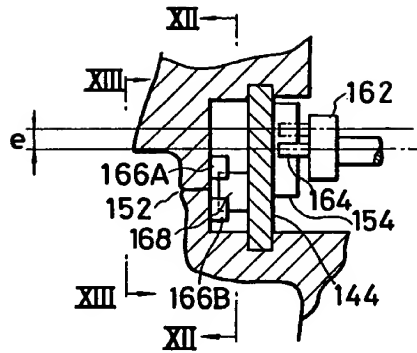


FIG. 12

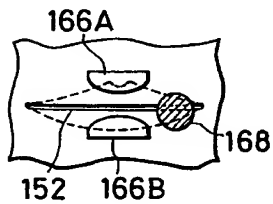


FIG. 13

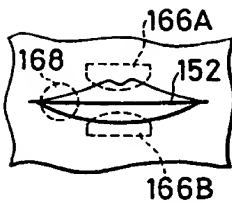


FIG. 14

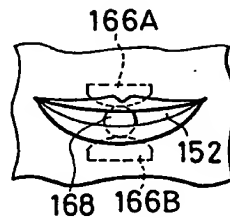


FIG. 15

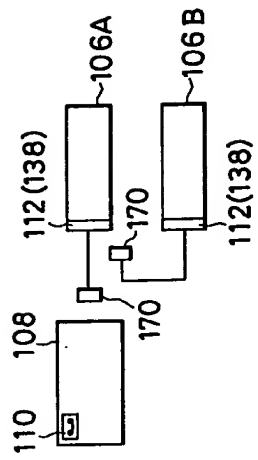


FIG. 16

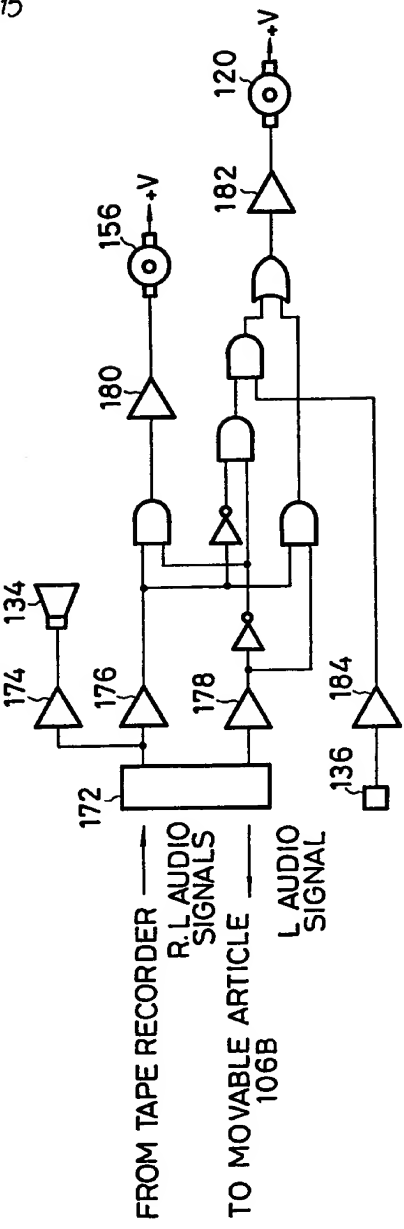


FIG. 17

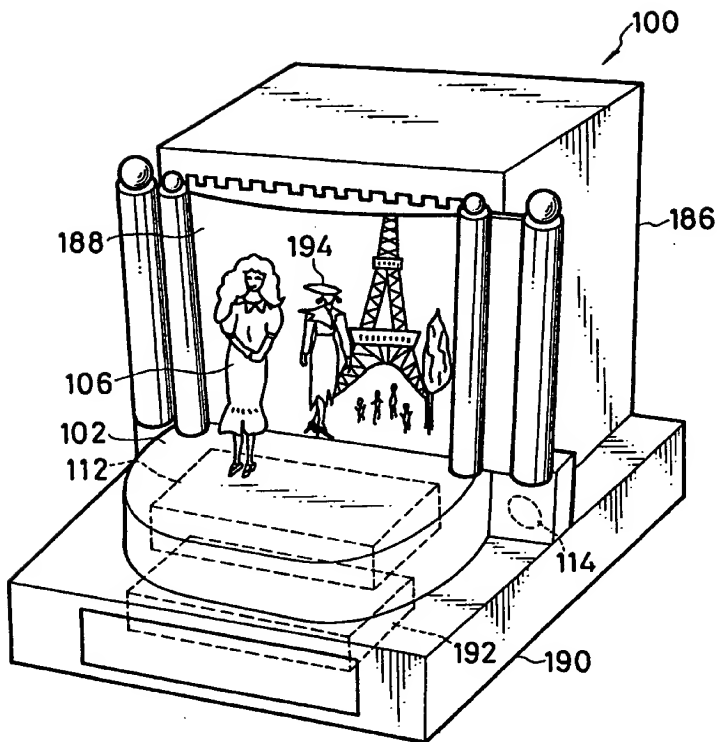
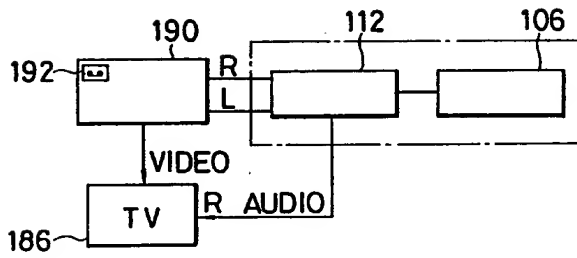


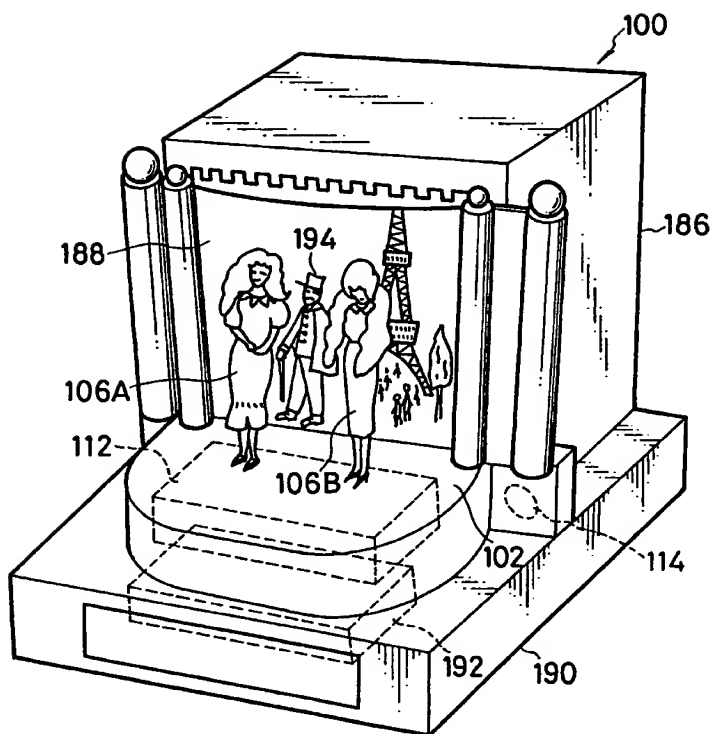


FIG. 18



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FIG. 19



10/15

FIG. 20

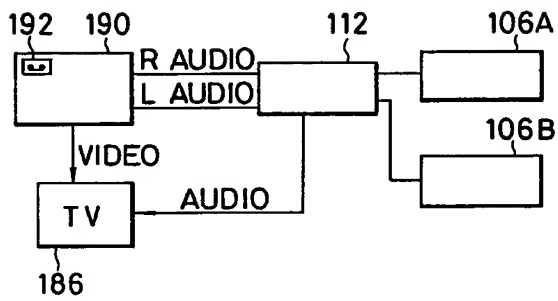


FIG. 21

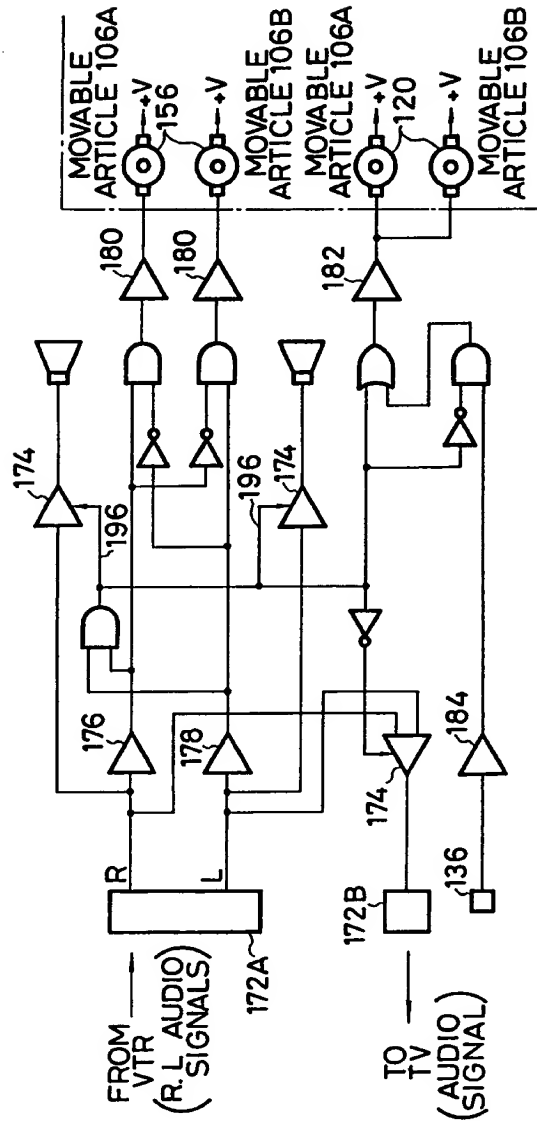


FIG. 22

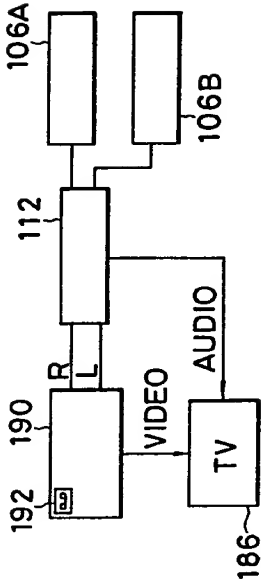


FIG. 23

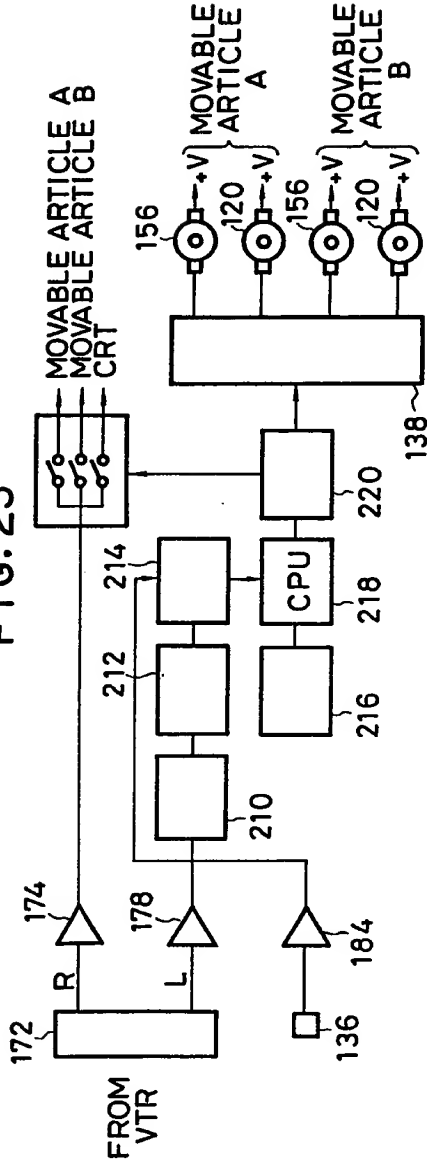


FIG. 24

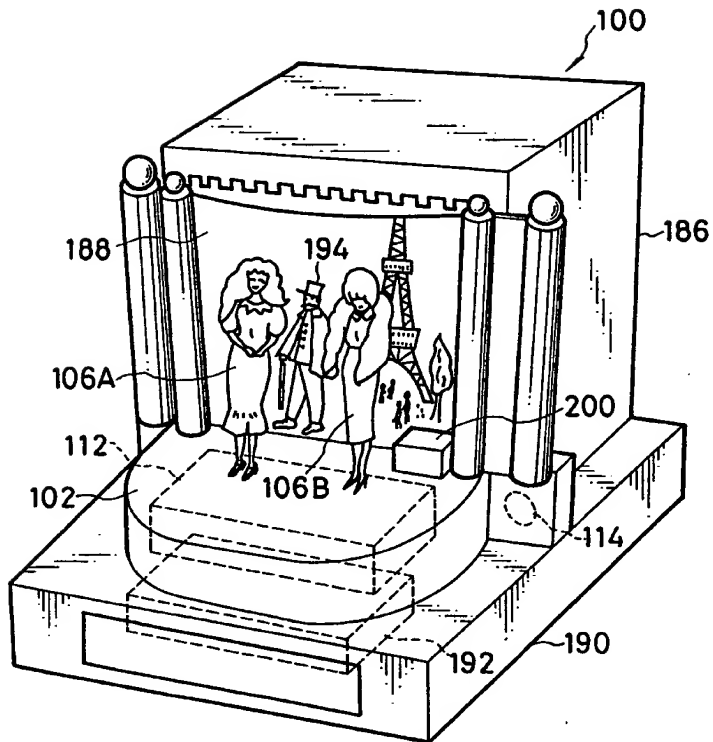


FIG. 25

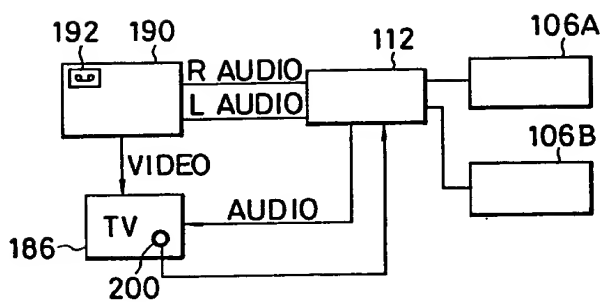
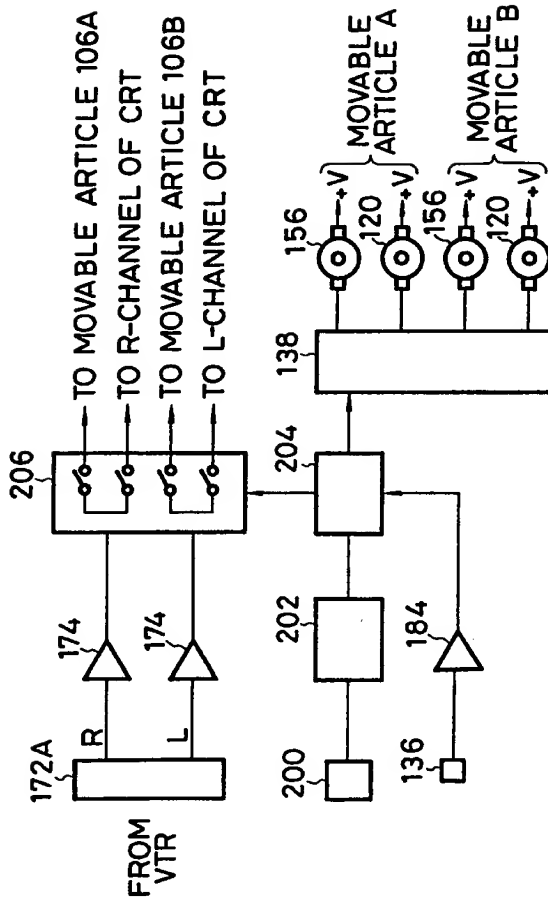


FIG. 26





## COMMUNICATION PRODUCING SYSTEM

This invention relates to communication producing or animation

systems which operate to suggest communication among exhibited movable articles (E.G. formed in imitation of a human beings, animals, plants; characters such as hero, heroine of a comic picture, and the like) or between such movable articles and an image reproduced on an image display from a video tape or the like.

Conventionally, program control by a computer is used for such a communication producing system.

In a conventional communication producing system, it is required to increase the number of steps in to allow the system to give satisfactory performance.

Unfortunately, this renders a computer program highly complicated, so that much labor and time are required to make the program. Also, the execution of such a complicated program requires a highly expensive computer unit of complicated structure. Thus, a conventional communication producing system is not suitable for use on a small scale such as in the home.

Accordingly, it would be highly desirable to develop a communication producing system which is capable of effectively carrying out satisfactory performance on any scale and capable of using a readily prepared computer program and readily available equipment.

Generally speaking, in accordance with the present invention, a communication producing system is provided which includes at least one movable article including at least one drive unit for actuating at least a part of the movable article and

recording means including track means on which information of at least the movable article is recorded. The recording means may be an audio tape or a video tape. The system also includes reproducing means for replaying the recording means to carry out at least the reproducing of the information on the recording means in the form of a sound signal; loudspeaker means for outputting the reproduced sound signal in the form of sound; and control circuitry for receiving the reproduced sound signal from the reproducing means to discriminate the track means corresponding to the reproduced sound signal to actuate the movable article through the drive unit depending upon the informations on the track means, resulting in the movable article being actuated in association with at least the reproducing means.

In accordance with the present invention there is also provided a communication producing system. which includes at least two movable articles each including at least one drive unit for actuating at least a part of the movable article and an audio tape including at least two tracks on which sound informations of the movable articles are recorded, respectively. Also, the system includes reproducing means for replaying the audio tape to reproduce each of the sound informations of the movable articles recorded on the tracks of the audio tape in the form of a sound signal; loudspeaker means for the movable articles which receives the reproduced sound signal to generate sound therefrom; and control circuitry for receiving the reproduced sound signal from the reproducing means to discriminate the track on which the sound information corresponding to the reproduced sound signal is recorded, to thereby selectively actuate the drive units of the movable articles and supply the reproduced sound signals to the loudspeaker means depending upon the sound informations on the tracks and a combination thereof, resulting in performing a communication between the movable articles.

Also, in accordance with the present invention, a communication producing system includes at least one movable article including at least one drive unit for actuating at least a part of the movable article; a video tape recorder for carrying out sound reproducing and image producing; an image display unit for displaying thereon an image reproduced by the video tape recorder; loudspeaker means for outputting sound reproduced by the video tape recorder; and a video tape on which sound informations for the movable articles and image display unit and image information for the image display unit are recorded. The video tape is replayed by the video tape recorder. Also, the system includes control circuitry receiving a sound signal reproduced by the video tape recorder to control the drive unit, the loudspeaker means, and the image and sound of the image display unit to establish at least a predetermined communication between the operation and sound of the movable article and the image and sound of the image display unit.

Further, in accordance with the present invention, a communication producing system includes at least two movable articles each including at least one drive unit for actuating at least a part of the movable article; a video tape recorder for carrying out sound reproducing and image producing; an image display unit for displaying thereon an image reproduced by the video tape recorder; a video tape having a video track on which image information for the image display unit is recorded and stereo audio track means comprising two audio tracks on one of which sound information for one of the movable articles is recorded and on the other of which sound information for the other of the movable articles is recorded. Sound information for the image display unit is concurrently recorded on both audio tracks. Also, the system includes loudspeaker means for outputting sound for the movable articles reproduced due to replaying of the

video tape by the video tape recorder; and control circuitry for receiving a sound signal reproduced by the video tape recorder to discriminate the audio track on which the sound information corresponding to the reproduced sound signal is recorded to selectively actuate the drive units of the movable articles and supply the sound signal for each of the movable articles to the loudspeaker means depending upon the sound informations on the tracks and a combination thereof, to thereby control the drive units, loudspeaker means and image display unit to establish a predetermined communication between the movable articles and/or between the image display unit and the movable articles.

In addition, in accordance with the present invention, a communication producing system

includes at least one movable article including at least one drive unit for actuating at least a part of the movable article; a video tape recorder for carrying out sound reproducing and image producing; an image display unit for displaying thereon an image reproduced by the video tape recorder; a video tape having a video track on which image information for the image display unit and stereo audio track means comprising two audio tracks on one of which sound information is recorded and on the other of which a digital control signal for a sound generation and selection program is recorded; loudspeaker means for outputting sound for the movable article reproduced due to replaying of the video tape by the video tape recorder; and

control circuitry for receiving a sound signal and the digital control signal reproduced by the video tape recorder to selectively actuate the drive unit of the movable article and supply the reproduced sound signal to the loudspeaker means depending upon the reproduced digital control signal, to thereby control the drive unit, loudspeaker and image display unit to establish a predetermined communication between the movable article and

the image display unit.

Furthermore, in accordance with the present invention, a communication producing system

includes at least one movable article including at least one drive unit for actuating at least a part of the movable article; a video tape recorder for carrying out sound reproducing and image producing; an image display unit for displaying thereon an image reproduced by the video tape recorder; and a video tape on which sound informations for the movable article and image display unit and image information for the image display unit are recorded. The video tape is replayed by the video tape recorder. Also, the system includes an image detecting means for detecting and decoding an image on a predetermined position of an image plane of the image display unit; loudspeaker means for outputting sound for the movable article; and control circuitry for receiving an image signal from the image detecting means to selectively actuate the movable article and supply a sound signal reproduced due to replaying of the video tape by the video tape recorder to the loudspeaker means.

Accordingly, the present invention can provide a communication producing system which is capable of permitting viewers or audiences to be impressed as if there is communication between movable articles and/or between movable articles and reproducing means with a simple structure; preferred embodiments can

variously use an audio tape and a tape recorder which are readily commercially available, use

a program for actuating the system easily prepared, be easily maintained.

and be conveniently practiced on a small scale as well as on a large scale.

For a fuller understanding of the invention, reference is had to the following description taken in connection with the accompanying drawings in which like reference numerals designate like or corresponding parts throughout and in which :

Fig. 1 is a perspective view generally showing an embodiment of a communication producing system according to the present invention;

Fig. 2 is a front elevation view partly in section showing a movable article incorporated in the communication producing system shown in Fig. 1;

Fig. 3 is a fragmentary side elevation view of the movable article shown in Fig. 2;

Fig. 4 is a fragmentary front elevation view showing the head section of the movable article shown in Fig. 2;

Fig. 5 is a sectional side elevation view of the head section shown in Fig. 4;

Fig. 6 is a sectional view taken along line VI-VI of Fig. 5;

Fig. 7 is a fragmentary end view taken along line VII-VII of Fig. 5;

Fig. 8 is a fragmentary end view taken along line

VIII-VIII of Fig. 5;

Figs. 9 and 10 each are a fragmentary front elevation view of the front section of Fig. 4 showing the operation of eyes and a mouth;

Fig. 11 is a fragmentary sectional view of the head section of Fig. 4 showing a mouth moving mechanism arranged in the head section;

Fig. 12 is a fragmentary end view taken along line XII-XII of Fig. 11;

Fig. 13 is a fragmentary schematic view taken along line XIII-XIII of Fig. 11;

Fig. 14 is a fragmentary schematic view similar to Fig. 13;

Fig. 15 is a circuit diagram showing an electric circuit for actuating the communication producing system shown in Fig. 1;

Fig. 16 is a circuit diagram showing a control circuit incorporated in the communication producing system shown in Fig. 1;

Fig. 17 is a perspective view generally showing another embodiment of a communication producing system according to the present invention;

Fig. 18 is a circuit diagram showing an electric circuit for the communication producing system of Fig. 17;

Fig. 19 is a perspective view generally showing a further embodiment of a communication producing system according to the present invention;

Fig. 20 is a circuit diagram showing an electric circuit for actuating the communication producing system shown in Fig. 19;

Fig. 21 is a circuit diagram showing a control circuit incorporated in the communication producing system shown in Fig. 19;

Fig. 22 is a circuit diagram showing an electric circuit for still another embodiment of a communication producing system according to the present invention;

Fig. 23 is a circuit diagram showing a control circuit incorporated in the communication producing system shown in Fig. 22;

Fig. 24 is a perspective view generally showing a still further embodiment of a communication producing system according to the present invention;

Fig. 25 is a circuit diagram showing an electric circuit for actuating the communication producing system shown in Fig. 24; and

Fig. 26 is a circuit diagram showing a control circuit incorporated in the communication producing system shown in Fig. 24.

Fig. 1 generally shows an embodiment of a communication producing system according to the present invention. The system generally indicated at reference numeral 100 includes a stage 102 provided on a rear portion thereof with a background 104, a pair of movable articles 106A and 106B each formed in imitation of a lady or a girl and arranged on the stage 102, a tape recorder 108 serving as reproducing means for carrying out the replaying of an audio tape 110 acting as recording means. A cassette audio tape and a cassette tape recorder may be used as the audio tape 110 and tape recorder 108, respectively. In the stage 102 is arranged a control circuit 112 which is electrically connected to the tape recorder 108. The tape recorder 108 includes a loudspeaker 114 from which sound is output. In the embodiment, the stage 102 is provided on the tape recorder 108.

The movable articles 106A and 106B are each so constructed that an arm, a leg, eyes and the



mouth thereof are actuated through a motor, the motors acting as a part of a drive unit, as shown in Figs. 2 to 10.

The actuation of the arm and leg is described with reference to Figs. 2 and 3.

For this purpose, the movable articles 106A and 106B each include an arm and leg actuating mechanism for actuating an arm 116 and a leg 118 which includes a motor 120 serving as a part of a first drive unit and provided with a pinion 122 and a first gear train 124 engaged with the pinion 122 of the motor 120 and operatively connected to the arm 116 to transmit the output of the motor 120 to the arm 116 to pivotally move the arm 116. Also, the arm and leg actuating mechanism includes a second gear train 126 operatively connected between the pinion 122 of the motor 120 and the leg 118 to pivotally move it. The other arm 128 is stationarily provided and the other leg 130 is fixedly on a base 132 arranged on the stage 102 to erectly hold the movable article 106 thereon. The arm 116 and leg 118 are vertically held when the motor 120 is turned off; however, when the motor 120 is driven, they are pivotally moved as indicated at phantom lines in Fig. 3.

In each of the movable articles 106A and 106B is arranged a loudspeaker 134. Alternatively, the loudspeaker 134 may be arranged in proximity to the movable article. One such loudspeaker may be provided common to both movable articles. The movable articles 106A and 106B, as shown in Fig. 3, each include a sound sensor 136 and a drive circuit 138 electrically connected to the sound sensor 136, as well as to the motor 120 and loudspeaker 134. The drive circuit 138 is also electrically connected to the control circuit 112 using lead wire means (not shown). The control circuit 112 may be arranged in the drive circuit 138.

The actuation of the eyes and mouth of each of the movable articles 106A and 106B is described hereinafter with reference to Figs. 4 to 10.

For this purpose, each of the movable articles 106A and 106B includes an eye and mouth actuating mechanism for actuating eyes 140 and mouth 142, which includes a movable plate 144 arranged in the head section 145 of the movable article or movable girl doll so as to be slidable in the lateral direction of the movable article. The movable plate 144 is provided on the upper portion of the front surface thereof corresponding to the openings 146 of the eyes 140 with a pair of pupil marks 148 and at the lower portion of the front surface thereof with an artificial flower 150, which is arranged so as to outwardly extend from the movable plate 144 through a laterally extending slit 152 of the mouth 142. The movable plate 144 is provided on the rear surface thereof with a pair of projections 154 vertically extending parallel to each other and each acting as a guide. Also, in the head section 145 is arranged a motor 156 serving as a part of a second drive unit, which is operatively connected through a gear 158 and a reduction unit 160 to a rotating plate 162 including an eccentric pin 164 eccentrically arranged by an amount of  $e$  with respect to the center of the rotating plate 162, resulting in the rotating plate 162 being rotated when the motor 156 is turned on or driven. The eccentric pin 164 is engagedly fitted between the guides 154, so that the rotation of the rotating plate 162 may cause the movable plate 144 to be laterally moved through the operative engagement between the eccentric pin 164 and the guides 154. The motor 156 is electrically connected to the drive circuit 138 (Fig. 3). Thus, the driving of the motor 156 causes the movable plate 144 to be laterally moved, resulting in the pupils 148 and flower 150 being laterally moved.

The movable articles 106A and 106B, as shown in Figs. 11 to 14, may be so constructed so as to actuate the mouth as if the movable article or girl doll talks. For this purpose, cams 166A and 166B are provided on the upper

and lower portions of the rear side of the slit 152 and a projection 168 serving as a striker is provided on the front surface of the movable plate 144, so that the striker 168 strikes against the cams 166A and 166B at the center of stroke of its lateral movement to open the slit 152 as shown in Fig. 14, resulting in a viewer or audience gaining the impression that the movable articles 106A and 106B have a conversation with each other.

The movable articles each may be so constructed that portions, other than the eyes, mouth, arm and leg, or the whole movable article, may be actuated.

Now, a circuit for producing a communication or conversation between the movable articles 106A and 106B and its function is described hereinafter with reference to Figs. 15 and 16.

The audio tape 110 replayed by the tape recorder 108, as shown in Fig. 15, has a stereo track comprising an R track and an L track. On the R track and L track are recorded sound for the movable article 106A and that for the movable article 106B, respectively. In Fig. 15, reference numeral 170 designates a stereo plug.

The control circuit 112 may be constructed as shown in Fig. 16. More particularly, it may be constructed so as to function depending on a sound signal on the R side supplied thereto, a sound signal on the L side supplied thereto and a combination between both sound signals in such a manner that when the sound signal on the R side is supplied to the control circuit 112, it causes the movable article 106A to move its eyes and mouth and generate sound; when the sound signal on the L side is supplied to the control circuit 112, it causes the movable article 106B to move its eyes and mouth and generate sound; when both sound signals are input thereto, both movable characters 106A and 106B move the arms and legs and generate sound; and when both sound signal are not input thereto, both movable

articles 106A and 106B move the arms and legs in response to external sound such as, for example, viewers' or audiences' hand clapping which is detected by the sound sensors 136 of both movable articles. The control circuit may be so constructed that when the sound signals on both R and L sides are supplied thereto, it prevents the generation of sound from at least one of the movable articles using a muting circuit (not shown).

On the audio tape 110, a conversation, a song, an explanation and the like which the movable articles 106A and 106B perform depending on the supply of the sound signals to the control circuit 112 in the above-described manner may be recorded according to a predetermined program. Accordingly, when the audio tape 110 is replayed by the tape recorder 108, the communication producing system of the illustrated embodiment permits the movable articles 106A and 106B to play as if there is communication therebetween. As the audio tape 110 and tape recorder 108 may be used commercially readily available ones such as a cassette audio tape and a cassette tape recorder. Thus, it will be noted that the communication producing system of the illustrated embodiment may be constructed in simple manner and its maintenance may be easily carried out. Also, it permits the program to be readily prepared. In Fig. 16, reference numeral 172 designates an input and output connector, 174 is an audio amplifier, 176 is an input amplifier for an R channel, 178 is an input amplifier for an L channel, 180 and 182 each are a motor drive, and 184 is a sensor amplifier.

In the illustrated embodiment, an increase in the number of electrical connections permits a plurality of additional movable articles such as flowers and animals to desirably perform in several groups.

In the above-described embodiment, the double-track audio tape 110 having the R track and L track is used and two such movable articles 106A and 106B in imitation of a

girl are arranged. Alternatively, the use of a multi-track audio tape and a reproducing unit for such audio tape permits three or more movable articles to join in communication. In this instance, a loudspeaker 134 may be provided for each of the movable articles. Alternatively, one such loudspeaker may be provided common to all the movable articles.

Loudspeakers for the movable articles 106A and 106B and tape recorder 108 such as the loudspeakers 114 and 134 may be provided for each of the movable articles and tape recorder. In this instance, the generation of sound is carried out through the respective loudspeakers. When the tape recorder is of the stereo type, two loudspeakers may be provided at the tape recorder. Alternatively, the loudspeaker arrangement may be carried out in such a manner that a loudspeaker is provided common to at least a part of the movable articles and a loudspeaker is provided for the tape recorder, wherein the common loudspeaker generates sound of each of the movable articles and the loudspeaker for the tape recorder generates sound reproduced by the tape recorder. Alternatively, a single loudspeaker is provided common to all the movable articles and tape recorder, wherein sound from each of the movable articles and tape recorder is output through the single loudspeaker. Also, the loudspeaker for the tape recorder may be eliminated.

When the movable articles are arranged in close proximity to each other or the tape recorder as when the communication producing system is constructed on a small scale, a single loudspeaker may be conveniently provided common thereto as described above. Such arrangement of the single loudspeaker permits the mechanical and electrical structure of the communication producing system to be highly simplified. This results in the system being significantly small-sized and readily handled.

In the arrangement of the loudspeaker(s) described above, the relationship between the sound information on the audio track means and the sound therefrom may be determined, for example, in such a manner that the generation of sound from the movable articles, the generation of sound from the reproducing means or tape recorder, the driving of the drive units, or the stopping of sound generation is carried out according to a predetermined order or program depending on the sound informations on the L and R tracks of the audio tape and a combination of the sound informations. Alternatively, the operation of the movable articles such as the actuation of the drive units, the generation of sound or the like may be carried out upon detection of external sound of a predetermined level or more by the sound sensors.

The communication producing system of the illustrated embodiment may be constructed so as to carry out further operation such as light-emission, illumination or the like.

The determination as to whether the sound sensor responds to external sound may be carried out not only when the portions of both R and L tracks of the audio tape which are free of the sound information are concurrently executed or operated by the tape recorder but when the generation of sound is prevented by a muting circuit or the like.

As can be seen from the foregoing, the communication producing system of the illustrated embodiment gives a viewer the impression of communication between the movable articles with a simple structure, because it can use an audio tape and a tape recorder which are readily commercially available. Also, the illustrated embodiment permits a program for actuating the system to be easily prepared and facilitates maintenance. Further, the system of the embodiment may be practiced on a small scale such as in the home.

Figs. 17 to 19 show another embodiment of a

communication producing system according to the present invention. This illustrated embodiment is adapted to perform or produce communication between a movable article and an image formed on an image display unit such as a cathode ray tube (CRT) unit. For this purpose, the system includes a movable article 106 and a CRT unit 186 having an image plane 188. Also, the system includes a video tape recorder (VTR) 190 in place of the tape recorder 108 in the first embodiment described above. The video tape recorder 190 is adapted to replay a video tape 192. The CRT unit 186 includes a loudspeaker 114 for outputting sound for the CRT unit reproduced by the VTR 190, which is arranged at the lower corner portion of the image plane 188. The remaining part of the system 100 and the movable article 106 may be mechanically constructed in substantially the same manner as in the above-described embodiment.

A circuit for producing a communication such as a conversation between the movable article 106 and an image on the CRT unit 186 and its function is described hereinafter with reference to Fig. 18.

The video tape 192 replayed by the video tape recorder 190, as shown in Fig. 18, has a video track on which an image data or image information for the CRT unit 186 is recorded and stereo track means comprising an R track and an L track. On the R track is recorded sound information for the movable article 106. On the L track is recorded sound information for a character 194 displayed on the image plane 188 of the CRT unit 186 or that for background music, a narration or the like relating to an image displayed on the image plane 188.

A control circuit 112 may be constructed in substantially the same manner as shown in Fig. 16. More particularly, the control circuit may be constructed so as to function depending on a sound signal on the R side supplied to the thereto, a sound signal on the L side

supplied thereto and a combination between both sound signals in such a manner that when the sound signal on the R side is supplied to the control circuit 112, it causes the movable article 106 to move its eyes and mouth and generate sound; when the sound signal on the L side is supplied to the control circuit 112, it causes generation of sound relating to an image on the image plane 188 of the CRT unit 186 such as the character 194 or the like; when both sound signals are input thereto, the movable article 106 moves its arm and leg and the movable article 106 and the image on the CRT unit 186 generate sound; and when both sound signals are not input thereto, the movable article 106 moves the arm and leg in response to external sound such as, for example, viewers' or audiences' hand clapping or the like which is detected by sound sensors 136, without generating sound. The control circuit may be so constructed that when the sound signals on both R and L sides are supplied thereto, it prevents the generation of sound from the movable article 106 using a muting circuit (not shown).

On the video tape 192, a conversation, a song, an explanation or the like which the movable article 106 and the character 194 on the image plane 188 perform according to a predetermined story depending on the supply of the sound signals to the control circuit 112 in the above-described manner, or a narration, background music or the like relating to the image on the image plane 188 may be recorded according to a predetermined program. Accordingly, when the video tape 192 is replayed by the video tape recorder 190, the communication producing system of the illustrated embodiment permits the movable article 106 to play as if it talks to the character 194, the narration or the like relating to the image on the image plane 188. As the video tape 192 and video tape recorder 190 may be effectively used readily commercially available ones. Thus, it will be noted that the communication



producing system of the illustrated embodiment may be constructed in a simple manner and its maintenance may be easily carried out. Also, it permits the program to be readily prepared.

In the above-described embodiment, the double-track video tape having the R track and L track is used and the single movable article in imitation of a girl are arranged. Alternatively, the use of a multi-sound-track video tape such as a four-track stereo video tape and a reproducing unit for such audio tape permits two or more movable articles to join in communication. In this instance, a loudspeaker 114 may be provided for each of the movable articles. Alternatively, one such loudspeaker may be provided common to all the movable articles.

In the illustrated embodiment, an increase in the number of electrical connections permits a plurality of additional movable articles such as flowers and animals to perform in several groups.

Figs. 19 to 21 show a further embodiment of a communication producing system according to the present invention.

The system of Figs. 19 to 21 is adapted to produce communication between at least two movable articles 106A and 106B and a background image, particularly, a character 194 appearing on image plane 188 of a CRT unit 186. Thus, in the illustrated embodiment, two such movable articles 106A and 106B are arranged on a stage 102 and a video tape 192 is used which has stereo audio track means comprising two audio tracks. One of the tracks of the audio track means is recorded sound information for one of the movable articles 106A and 106B and on the other track is recorded sound information for the other movable article. Also, on both tracks are concurrently recorded sound information for the CRT unit 186 serving as an image display unit. The movable articles 106A and 106B each may be constructed in substantially the same manner as in the

embodiments described above. A control circuit 102 is adapted to selectively judge or discriminate the audio tracks on which the sound informations corresponding to reproduced sound signals are recorded to selectively actuate the movable articles depending on the sound informations and a combination thereof and output sound for each of the movable articles from the corresponding loudspeaker, as well as to utilize an image on the image display unit as a background.

The video tape 192 replayed by the video tape recorder 190, as briefly described above and shown in Fig. 20, has the video track on which image data or image information for the CRT unit 186 is recorded and the stereo audio track means comprising two audio tracks or an R audio track and an L audio track. On the R track is recorded sound information for the movable article 106A and on the L track is recorded sound information for the movable article 106B in a manner to prevent from concurrent sound generation. Also, on both R and L audio tracks is concurrently recorded sound information for the image displayed on the image plane 188 of the CRT unit 186 such as sound information for the character 194, background music, a narration or the like relating to the image. 188.

A control circuit 112 may be constructed as shown in Fig. 22. More particularly, the control circuit may be constructed so as to function depending on a sound signal on the R side supplied thereto, a sound signal on the L side supplied thereto and a combination of both sound signals in such a manner that when the sound signal on the R side is supplied to the control circuit 112, it causes the movable article 106A to move its eyes and mouth and generate sound; when the sound signal on the L side is supplied to the control circuit 112, it causes the movable article 106B to move its eyes and mouth while generating sound; when both sound signals are input thereto, the movable articles 106A and 106B each move its arm and leg

and sound is generated which relates to the image such as the character 194 or the like displayed on the image plane 188 of the CRT unit 186; and when both sound signals are not input thereto, the movable articles 106A and 106B each move the arm and leg in response to external sound such as, for example, viewers' or audiences' hand clapping or the like which is detected by sound sensors 136, without generating sound.

On the video tape 192, a conversation, a song, an explanation or the like which the movable articles 106A and 106B perform according to a predetermined story depending on the supply of the sound signals to the control circuit 112 in the above-described manner may be recorded according to a predetermined program. Alternatively, a narration, background music or the like relating to the image on the CRT unit such as the character 194 may be recorded thereon. Accordingly, when the video tape 192 is replayed by the video tape recorder 190, the communication producing system of the illustrated embodiment permits the movable articles 106A and 106B to play as if they talk to each other and/or the character 194 of the image on the image plane 188, as well as the image on the CRT unit 186 to create an atmosphere on the stage 102. In the illustrated embodiment, the control circuit is so constructed that when the sound signals on both R and L sides are supplied thereto, it prevents the generation of sound from each of the movable article 106A and 106B using a muting signal supplied through muting circuits designated by reference numeral 196 in Fig. 21.

Figs. 22 and 23 show still another embodiment of a communication producing system according to the present invention. In this embodiment, two movable articles 106A and 106B which are constructed in substantially the same manner as described above are arranged and a video tape 192 is used which has stereo audio track means comprising two audio tracks. On one of

the audio tracks is recorded audio or sound information and on the other audio track is recorded digital control signal information for a sound generation and selection program, so that the movable articles 106A and 106B each may be selectively actuated through a drive unit thereof depending on a digital control signal and a sound signal for each of the movable articles reproduced from a video tape recorder 190 may be output through a loudspeaker of each movable article. In the embodiment, CRT unit 186 and the video tape recorder 190 are constructed in substantially the same manner as described above.

The video tape 192 replayed by the video tape recorder 190 has audio track means comprising two audio tracks or an R audio track and an L audio track. On the R audio track are recorded sound informations for the movable article 106A, movable article 106B and an image on the CRT unit 186 according to a predetermined program. On the L audio track are recorded a program data in the form of a digital signal which serves to output, from an output interface to each of loudspeakers, a signal for changing over sound signals in synchronism with sound according to the program.

A control circuit 112 is constructed as shown in Fig. 23. More particularly, the control circuit 112 is constructed so as to desirably control sound informations from the movable articles 106A and 106B and the image on the CRT unit 186 including the character 194 to complicatedly and finely perform communication among them. Also, the control circuit 112 may so act that when both sound signals are not input thereto from the R and L tracks and the loudspeakers do not output sound, the movable articles 106A and 106B each move the arm and leg in response to external sound such as, for example, viewers' or audiences' hand clapping or the like which is detected by sound sensors 136, without generating sound. This causes the audiences to take much interest and surprise.

Loudspeakers for the movable articles 106A and 106B and the image display unit or video tape recorder 190 may be provided separately in correspondence to the respective movable articles and tape recorder, wherein the generation of sound is carried out through the respective loudspeakers. In this instance, the loudspeaker for each of the movable articles may be integral or separate with respect to the movable article and the loudspeaker for the video tape recorder may be attached thereto. Alternatively, the loudspeaker arrangement may be carried out in such a manner that a loudspeaker is provided common to at least a part of the movable articles and another loudspeaker is provided with respect to the video tape recorder, wherein the common loudspeaker generates sound of each of the movable articles and the loudspeaker for the tape recorder generates sound reproduced by the video tape recorder. Alternatively, a single loudspeaker is provided common to all the movable articles and tape recorder, wherein sound from each of the movable articles and video tape recorder is output through the single loudspeaker. In this instance, the loudspeaker for the video tape recorder may be used for this purpose. Also, the loudspeaker for the tape recorder may be eliminated.

When the movable articles are arranged in close proximity to each other or to the tape recorder as when the communication producing system is constructed on a small scale, a single loudspeaker may be conveniently provided common thereto as described above. Such arrangement of the single loudspeaker permits the mechanical and electrical structure of the communication producing system to be highly simplified. This results in the system being significantly small-sized and readily handled.

In the arrangement of the loudspeaker(s) described above, the relationship between the sound information on the audio track means and the sound output from each of the

loudspeakers may be determined, for example, in such a manner that the generation of sound for the movable articles, the generation of sound for the image display unit or video tape recorder, the driving of the drive units of the movable articles, or the stopping of sound generation is carried out according to a predetermined order or program depending on the sound informations on the L and R audio tracks of the video tape and a combination thereof. Alternatively, the operation of the movable articles such as the actuation of the drive units, the generation of sound or the like may be carried out upon detection of external sound of a predetermined level or more by the sound sensors.

The communication producing system of the illustrated embodiment may be constructed so as to carry out further operation such as light-emission, illumination and the like.

The determination as to whether the sound sensor responds to an external sound may be carried out not only when the portions of both R and L audio tracks of the video tape which are free of any sound information are concurrently operated by the tape recorder but when the generation of sound is prevented by a muting circuit or the like.

As can be seen from the foregoing, the communication producing system of each of the embodiments shown in Figs. 17 to 23 gives viewers or audiences the impression of communication among the movable articles and the image on the image display unit with a simple structure, because it can use a video tape and a video tape recorder which are readily commercially available. Also, the illustrated embodiment permits a program for actuating the system to be easily prepared and facilitates maintenance. Further, system of the embodiment may be practiced on a small scale such as in the home.

In Fig. 23, reference numeral 210 designates a filter, 212 is a wave shaping circuit, 214 is an input interface, 216 is a memory, 218 is a CPU and 220 is an output interface.

Fig. 24 to 26 show a still further embodiment of a communication producing system according to the present invention. This

illustrated embodiment, as shown in Fig. 24, is constructed in a configuration similar to the embodiment shown in Fig. 19. The system generally includes a stage 102, a pair of movable articles 106A and 106B each formed in imitation of a lady or a girl and arranged on the stage 102 and a cathode ray tube (CRT) unit 186 serving as an image display unit and having an image plane 188 acting as a background for the stage 102. In the illustrated embodiment, the movable articles 106A and 106B each may include its own output loudspeaker and at least one drive unit including a motor. The CRT unit 186 is put on a video tape recorder (VTR) 190 for replaying a video tape 192 and electrically connected to the VTR 190. The stage 102 is provided on the VTR 190. In the stage 102 is arranged a control circuit 112. The CRT unit 186 is provided with a loudspeaker 114 for outputting sound for an image reproduced by the video tape recorder 190.

The system of the illustrated embodiment also includes an image detecting sensor 200 for detecting a control image appearing at a predetermined position on the image plane 188 and decoding it according to a predetermined procedure to supply the decoded control image in the form of an output signal to the control circuit 112. In the illustrated embodiment, the image detecting sensor 200 is arranged opposite to a lower corner on the image plane 188 and the control image is adapted to appear at the lower corner. The control circuit 112 selects at least one loudspeaker of the movable articles 106A, 106B and CRT unit 186 for outputting a sound signal depending upon the

output signal. Concurrently, it selects a power supply and the motor of the drive unit for outputting an actuation signal to actuate them.

The decoding of the control image may be carried out using any one of various elements such as difference between white and black, difference in color, the recognition of a pattern of a simple configuration, a digital signal using black and white, and the like.

A circuit for producing a communication such as a conversation between the movable articles 106A and 106B and the image on the CRT unit 186 and its function is described hereinafter with reference to Figs. 25 and 26.

The video tape 192 replayed by the video tape recorder 190, as shown in Fig. 25, has a video track on which an image data or image information for the CRT unit 186 is recorded and stereo audio track means comprising an R track and an L track. On the R track are recorded sound information for the movable article 106A and sound information for an R side of the CRT unit 186. On the L track are recorded sound information for the movable article 106B and sound information for an L side of the CRT unit 186. The sound information for the CRT unit 186 may include sound information for a character 134 in an image on the image picture of the CRT unit 186, a background music, a narration or the like.

A control circuit 112 may be constructed as shown in Fig. 26.

The video track of the video tape 192 has an image recorded thereon so as to permit an image for a predetermined image signal to be formed on a predetermined portion of the image plane according to a predetermined program.

An output generated from the image detecting sensor 200 is decoded by an image signal decoder 202 and then supplied to an output control section 204. The output



control section 204 supplies to switching means 206 a control signal for selectively changing over the sound informations on the R and L sides with respect to the loudspeakers for the movable articles 106A and 106B and R and L channels of the CRT unit 186. Also, the output control section 204 supplies to a motor drive section 208 a control signal for changing over a power supply or selectively changing over an actuation signal with respect to motors, resulting in communication between the movable articles 106A and 106B and between the movable articles and the image on the image plane 188 and the operation of the movable articles being accomplished in a complicated manner.

On the video tape 192, a conversation, a song, an explanation or the like which the movable articles 106A and 106B and the character 194 on the image plane 188 perform according to a predetermined story, or a narration, background music or the like may be recorded according to a predetermined program. Accordingly, when the video tape 192 is replayed by the video tape recorder 190, the communication producing system of the illustrated embodiment permits the movable articles to play as if they talk to the character 194 or the narration relating to the image on the image plane 188. As the video tape 192 and video tape recorder 190 may be effectively used readily commercially available ones. Thus, it will be noted that the communication producing system of the illustrated embodiment may be constructed in simple manner and its maintenance may be easily carried out. Also, it permits the program to be readily prepared.

In the above-described embodiment, the double-track video tape having the R track and L track is used. Alternatively, the use of a multi-sound-track video tape such as a four-track stereo video tape and a reproducing unit for such audio tape permits three or more movable articles to join in communication. In this instance, a

loudspeaker may be provided with respect to each of the movable articles. Alternatively, one such loudspeaker may be provided common to all the movable articles.

Loudspeakers for the movable articles 106A and 106B and the image display unit or video tape recorder 190 may be provided separately in correspondence to the respective movable articles and video tape recorder, wherein the generation of sound is carried out through the respective loudspeakers. In this instance, the loudspeaker for each of the movable articles may be integrally or separately provided with respect to the movable article and the loudspeaker for the video tape recorder may be attached thereto. Alternatively, the loudspeaker arrangement may be carried out in such a manner that a loudspeaker is provided common to at least a part of the movable articles and another loudspeaker is provided with respect to the video tape recorder, wherein the common loudspeaker generates sound of each of the movable articles and the loudspeaker for the tape recorder generates sound reproduced by the video tape recorder. Alternatively, a single loudspeaker is provided common to all the movable articles and video tape recorder, wherein sound from each of the movable articles and video tape recorder is output through the single loudspeaker. In this instance, the loudspeaker for the video tape recorder may be used for this purpose. Also, the loudspeaker for the tape recorder may be eliminated.

When the movable articles are arranged in close proximity to each other or to the video tape recorder as when the communication producing system is constructed on a small scale, a single loudspeaker may be conveniently provided common thereto as described above. Such arrangement of the single loudspeaker permits the mechanical and electrical structure of the communication producing system to be highly simplified. This results in the system being significantly small-sized and readily

handled.

In the arrangement of the loudspeaker(s) described above, the relationship between the sound information on the audio track means and the sound output from each of the loudspeakers may be determined, for example, in such a manner that the generation of sound for the movable articles, the generation of sound for the image display unit or video tape recorder, the driving of the drive units of the movable articles, or the stopping of sound generation is carried out according to a predetermined order or program depending on the sound informations recorded on the L and R audio tracks of the video tape and a combination thereof. Alternatively, the operation of the movable articles such as the actuation of the drive units, the generation of sound or the like may be carried out upon detection of external sound of a predetermined level or more by sound sensors 136.

The communication producing system of the illustrated embodiment may be constructed so as to carry out further operation such as light-emission, illumination and the like.

In the illustrated embodiment, an increase in the number of electrical connections permits a plurality of additional movable articles such as flowers and animals to perform in several groups.

Also, the system of the illustrated embodiment is so constructed that the image signal generated from the image detecting sensor 200 causes the movable articles to be actuated upon detection of external sound such as audiences' hand clapping or the like by the sound sensor when any sound is not output from any loudspeaker. Such construction permits audiences or viewers to take much interest and surprise because of the impression of

communication between the audience and the movable articles.

The determination as to whether the sound sensor

responds to external sound may be carried out not only when the portions of both R and L audio tracks of the video tape which are free of any sound signal are concurrently operated by the tape recorder but when the generation of sound is prevented by a muting circuit or the like.

In Fig. 26, reference numeral 172A designates an input connector. Also, in the drawings, reference numeral 172B is an output connector.

As can be seen from the foregoing, the communication producing system of the embodiment shown in Figs. 24 to 26 gives viewers or audiences the impression of communication among the movable articles and the image on the image display unit with a simple structure, because it can use a video tape and a video tape recorder which are readily commercially available. Also, the illustrated embodiment permits a program for actuating the system to be easily prepared and facilitates maintenance. Further, system of the embodiment may be practiced on a small scale such as in the home.

C L A I M S :

1. A communication producing system comprising:  
at least one movable article including at least one drive unit for actuating at least a part of said movable article;

recording means including track means on which information of at least said movable article is recorded;

reproducing means for carrying out at least the reproducing of said information on said recording means in the form of a sound signal;

loudspeaker means for outputting said reproduced sound signal in the form of sound; and

control circuitry for receiving said reproduced sound signal from said reproducing means to discriminate said track means corresponding to said reproduced sound signal to actuate said movable article through said drive unit depending upon said informations on said track means, resulting in said movable article being actuated in association with at least said reproducing means.

2. A communication producing system comprising:  
at least two movable articles each including at least one drive unit for actuating at least a part of said movable article;

an audio tape including at least two tracks on which sound informations of said movable articles are recorded, respectively;

reproducing means for reproducing each of said sound informations of said movable articles recorded on said tracks of said audio tape in the form of a sound signal;

loudspeaker means for said movable articles which receives said reproduced sound signal to generate sound therefrom; and

control circuitry for receiving said reproduced sound signal from said reproducing means to discriminate the track on which the sound information corresponding to

said reproduced sound signal is recorded, to thereby selectively actuate said drive units of said movable articles and supply said reproduced sound signals to said loudspeaker means depending upon said sound informations on said tracks and a combination thereof, resulting in performing a communication between said movable articles.

3. A communication producing system as defined in Claim 2, wherein said loudspeaker means comprises loudspeakers provided for said respective movable articles.

4. A communication producing system as defined in Claim 2, wherein said loudspeaker means is provided common to at least a part of said movable articles.

5. A communication producing system as defined in Claim 2, wherein said reproducing means has a loudspeaker attached thereto;

said control circuit supplies said reproduced sound signal to said loudspeaker of said reproducing means as well as said loudspeaker means.

6. A communication producing system as defined in Claim 2, wherein two said articles are arranged and said audio tape has an R track and an L track.

7. A communication producing system as defined in Claim 2, wherein said control circuitry includes a sound sensor for detecting an external sound, to thereby selectively actuate said drive units depending said detected external sound while the replaying of said audio tape is being carried out with respect to the portions of said tracks which are concurrently free of said sound signal.

8. A communication producing system comprising:  
at least one movable article including at least one drive unit for actuating at least a part of said movable article;

a video tape recorder for carrying out sound reproducing and image producing;

an image display unit for displaying thereon an image reproduced by said video tape recorder;

loudspeaker means for outputting sound reproduced by said video tape recorder;

a video tape on which sound informations for said movable articles and image display unit and image information for said image display unit are recorded, said video tape being replayed by said video tape recorder; and

control circuitry for receiving a sound signal reproduced by said video tape recorder to control said drive unit, said loudspeaker means, and said image and sound of said image display unit to establish at least a predetermined communication between the operation and sound of said movable article and the image and sound of said image display unit.

9. A communication producing system as defined in Claim 8, wherein one said movable article is arranged;

said video tape has stereo audio track means comprising two audio tracks on one of which said sound information for said movable article is recorded and on the other of which said sound information for said image display unit is recorded;

said loudspeaker means outputting said sound for said movable article; and

said control circuitry discriminating the audio track on which the sound information corresponding to said reproduced sound signal is recorded to selectively actuate said drive unit of said movable article and supply said reproduced sound signal to said loudspeaker means depending upon said sound informations on said tracks and a combination thereof.

10. A communication producing system as defined in Claim 9, wherein said loudspeaker means is provided for said movable article.

11. A communication producing system as defined in Claim 8 or 9 further comprising a sound sensor for

detecting external sound;

said control circuitry being constructed so as to selectively actuate said drive unit of said movable article depending upon said external sound detected by said sound sensor when the portions of both audio tracks of the video tape which are free of any sound information are concurrently operated by the tape recorder.

12. A communication producing system comprising:  
at least two movable articles each including at least one drive unit for actuating at least a part of said movable article;

a video tape recorder for carrying out sound reproducing and image producing;

an image display unit for displaying thereon an image reproduced by said video tape recorder;

a video tape having a video track on which image information for said image display unit is recorded and stereo audio track means comprising two audio tracks on one of which sound information for one of said movable articles is recorded and on the other of which sound information for the other of said movable articles is recorded, sound information for said image display unit being concurrently recorded on both audio tracks;

loudspeaker means for outputting sound for said movable articles reproduced due to replaying of said video tape by said video tape recorder; and

control circuitry for receiving a sound signal reproduced by said video tape recorder to discriminate the audio track on which the sound information corresponding to said reproduced sound signal is recorded to selectively actuate said drive units of said movable articles and supply said sound signal for each of said movable articles to said loudspeaker means depending upon said sound informations on said tracks and a combination thereof, to thereby control said drive units, loudspeaker means and image display unit to establish a predetermined



communication between said movable articles and/or between said image display unit and said movable articles.

13. A communication producing system as defined in Claim 12, wherein said loudspeaker means comprising loudspeakers provided for said respective movable articles.

14. A communication producing system as defined in Claim 12 further comprising a sound sensor for detecting external sound;

said control circuitry being constructed so as to selectively actuate said drive unit of said movable article depending upon said external sound detected by said sound sensor when the portions of both audio tracks of the video tape which are free of any sound information are concurrently operated by the tape recorder.

15. A communication producing system comprising:  
at least one movable article including at least one drive unit for actuating at least a part of said movable article;

a video tape recorder for carrying out sound reproducing and image producing;

an image display unit for displaying thereon an image reproduced by said video tape recorder;

a video tape having a video track on which image information for said image display unit and stereo audio track means comprising two audio tracks on one of which sound information is recorded and on the other of which a digital control signal for a sound generation and selection program is recorded;

loudspeaker means for outputting sound for said movable article reproduced due to replaying of said video tape by said video tape recorder; and

control circuitry for receiving a sound signal and said digital control signal reproduced by said video tape recorder to selectively actuate said drive unit of said movable article and supply said reproduced sound signal to

said loudspeaker means depending upon said reproduced digital control signal, to thereby control said drive unit, loudspeaker and image display unit to establish a predetermined communication between said movable article and said image display unit.

16. A communication producing system as defined in Claim 15, wherein said loudspeaker means comprising loudspeakers provided for each of said respective movable articles.

17. A communication producing system as defined in Claim 15 further comprising a sound sensor for detecting external sound;

said control circuitry being constructed so as to selectively actuate said drive unit of said movable article depending upon said external sound detected by said sound sensor when the portions of both audio tracks of the video tape which are free of any sound information are concurrently operated by the tape recorder.

18. A communication producing system comprising:

at least one movable article including at least one drive unit for actuating at least a part of said movable article;

a video tape recorder for carrying out sound reproducing and image producing;

an image display unit for displaying thereon an image reproduced by said video tape recorder;

a video tape on which sound informations for said movable article and image display unit and image information for said image display unit are recorded, said video tape being replayed by said video tape recorder;

an image detecting means for detecting and decoding an image on a predetermined position of an image plane of said image display unit;

loudspeaker means for outputting sound for said movable article; and

control circuitry for receiving an image signal

from said image detecting means to selectively actuate said movable article and supply a sound signal reproduced due to replaying of said video tape by said video tape recorder to said loudspeaker means.

19. A communication producing system as defined in Claim 18, wherein said loudspeaker means comprising a loudspeaker provided for said movable article.

20. A communication producing system as defined in Claim 18 further comprising a sound sensor for detecting external sound;

said control circuitry being constructed so as to selectively actuate said drive unit of said movable article for a predetermined period of time based on said external signal detected by said sound sensor depending upon said image signal received from said image signal.

21. A communication producing system substantially as hereinbefore described with reference to Figs. 1 to 16 of the accompanying drawings.

22. A communication producing system substantially as hereinbefore described with reference to Figs. 17 and 18 and of the accompanying drawings.

23. A communication producing system substantially as hereinbefore described with reference to Figs. 19 to 21 of the accompanying drawings.

24. A communication producing system substantially as hereinbefore described with reference to Figs. 22 and 23 and of the accompanying drawings.

25. A communication producing system substantially as hereinbefore described with reference to Figs. 24 to 26 of the accompanying drawings.